Attentional Capacity and Clinical Performance: Eye Tracking Cardiologists Performing Simulated Coronary Angiography

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Simulation-based training is driven by patient safety and Kohn's 2000 report 'To Err is Human' revealing up to 96,000 patients die every year (USA) due to medical error. Computer-based simulation has been proven to produce a superior skill set with less errors and better transfer of training in general surgeons. Eye tracking features recently have shown to discriminate between novices and experts in surgical settings. An aspect of performance yet to be analysed is attentional capacity (AC) and the corresponding visual attention (VA) from eye tracking.

A PhD level study has been designed to capture visual attention during attempts of simulated coronary angiography while AC is tested. The Initial pilot study will recruit eight registrars and consultants. We hypothesise that VA is linked with AC and that expert surgeons will demonstrate higher capacity when tested.

The recording will take place in the ASSERT Centre, University College Cork, using a high-fidelity simulation suite. Participants perform a coronary angiography case twice alongside an additional task to measure AC. The task requires checking a supplementary display monitor and responding to playing cards when they appear. This added task acts as a measure of their AC. Primary outcomes will involve statistical analysis performed to determine the relationship between (1) AC and surgical performance, (2) VA and AC.

If found that predictive metrics exist for good/bad performances at surgical tasks, that will have implications for research areas of *Applied Computing*, *Human Factors and Human Computer Interaction* with interventional cardiology. Wearable technology creates the opportunity for cost-effective assessment that provides insight to the trainee psychophysiology. This could predict task performance, including errors, uncertainty and more. This combined with machine learning algorithms could produce accurate computer automated assessment in training.